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An Inlay Patellofemoral Arthroplasty With An Enlarged Trochlear Component Design Results In Better Patient Reported Outcomes Measures And Lower Failure Rates Compared To A Traditional Design: A Two-Year Follow Up Study

PD. Mag. Dr. med. univ.

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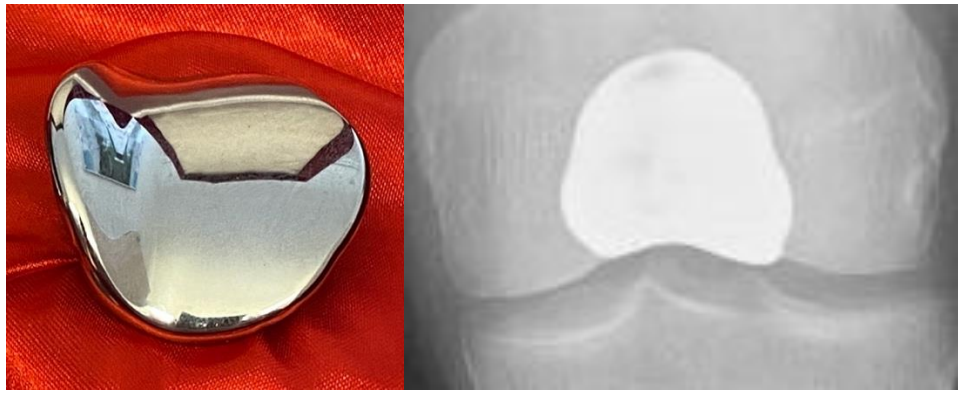
A.B. Imhoff is a consaltant of Arthrosurface (Franklin, MA, USA).

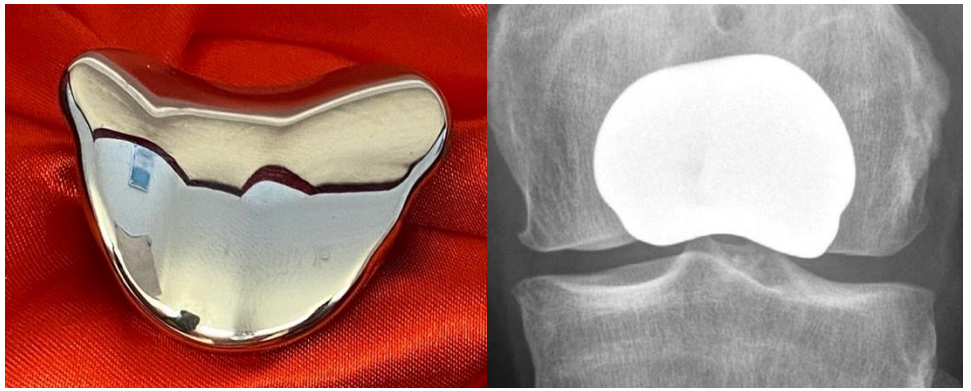
All other authores declare no competing interests.

The company Arthrosurface (Franklin, MA, USA) had no influence on the design, data collection and interpretation of the results of this study.

Background



Wave ®
Traditional Inlay Design



Kahuna ®
Further development of Wave
Inlay design with enlarged lateral component

Study Objective

Comparison of 2-year outcomes after primary isolated patellofemoral inlay arthroplasty (PFIA) using two different inlay components (Wave vs. Kahuna)

Hypothesis

An enlarged trochlear component design (Kahuna ®) leads to better postoperartive results than the conventional design (Wave ®).

Material & Methods

- Retrospective data evaluation of a prospective database survey

- **Indication:**
  - PF Osteoarthritis Kellgren-Lawrence III-IV
  - Frustrane conservative therapy
  - 2009 – 2016: Wave ➔ >2016: Kahuna

- **Inclusion Criteria**
  - Isolated PFIA without additional procedures
  - Minimum 2 years FU

- **Outcomes**
  - WOMAC, VAS Pain, Tegner Activity Scale
  - Reoperation, conversion to total joint arthroplasty
  - X-ray: Tibiofemoral osteoarthritis progression

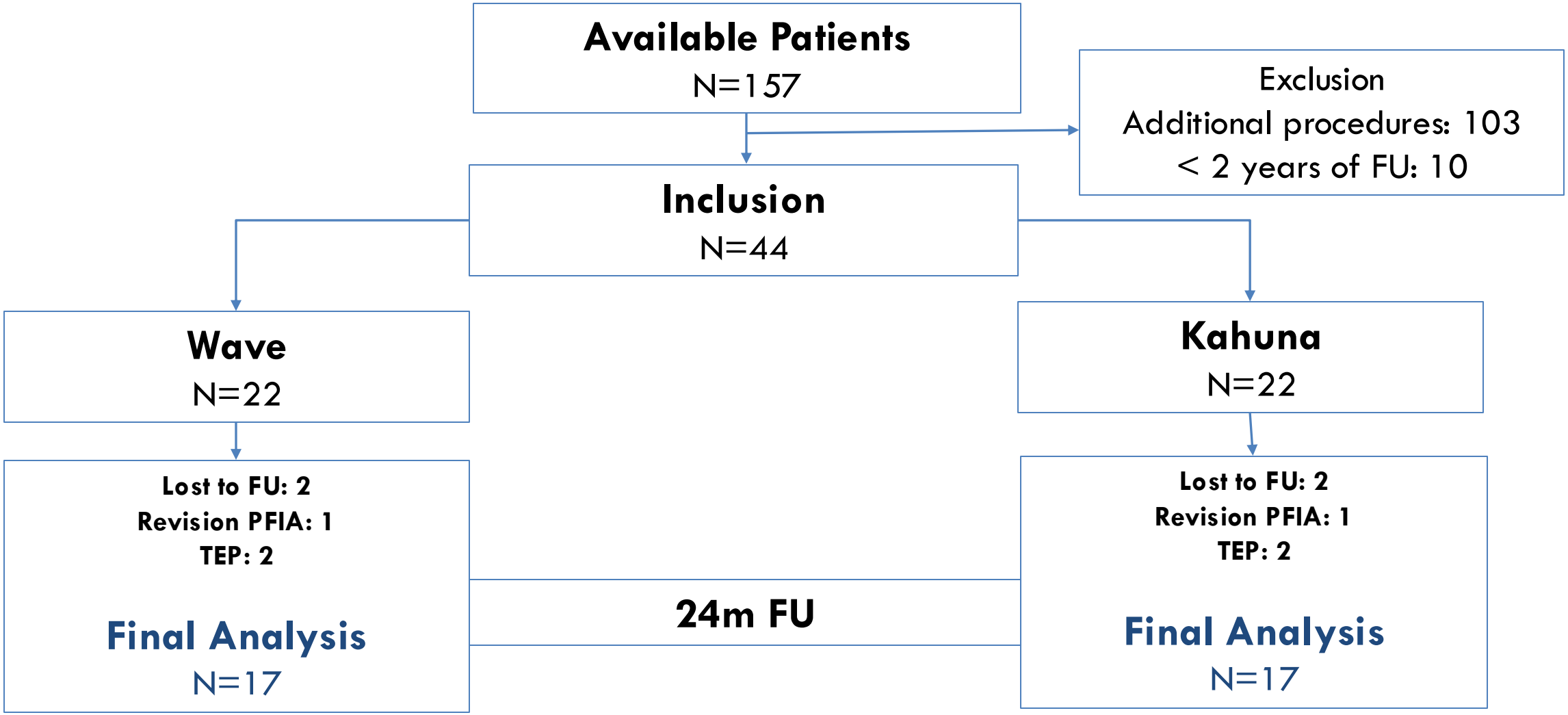
Statistics

- Group comparison (T-Test, Mann-Whitney U-Test

- Power Analysis:
  - MCID WOMAC*: 10±10 points
  - alpha=5%)
  - power of 80%

  - ➔**32 patients (16 per group)**

Results


Available Patients
N=157
Exclusion
Additional procedures: 103
< 2 years of FU: 10
Inclusion
N=44
Wave
N=22
Kahuna
N=22
Lost to FU: 2
Revision PFIA: 1
TEP: 2
Lost to FU: 2
Revision PFIA: 1
TEP: 2
24m FU
Final Analysis
N=17
Final Analysis
N=17

Results

	Wave	Kahuna	p-value
Follow-up (months)	24.1 ± 3.8	24.3 ± 2.1	0.94
Age at surgery (years)	51.6 ± 12.1	51.3 ± 11.5	0.95
Gender distribution			0.46
Male	7 (41.2%)	4 (23.5%)	
Female	10 (58.8%)	13 (76.5%)	
BMI (Kg/m²)	26.4 ± 3.6	25.5 ± 4.2	0.49
Operated side			1.00
Left	10 (58.8%)	11 (64.7%)	
Right	7 (41.2%)	6 (35.3%)	
Ipsilateral knee joint surgical history			0.59
None	3 (17.6%)	4 (23.5%)	
PF[a]	13 (76.5%)	10 (58.8%)	
Other[b]	1 (5.9%)	3 (17.6%)	

No group difference in age, gender, BMI, laterality and previous operations

Results

	Wave	Kahuna	p-Wert
PFOA			0.38
(Kellgren-Lawrence Classification)			
Grade 0	0 (0.0%)	0 (0.0%)	
Grade 1	0 (0.0%)	1 (5.9%)	
Grade 2	5 (29.4%)	5 (29.4%)	
Grade 3	5 (29.4%)	8 (47.1%)	
Grade 4	7 (41.2%)	3 (17.6%)	
Trochlear dysplasia			0.17
(Dejour Classification)			
None	9 (52.9%)	6 (35.3%)	
Type A	3 (17.6%)	6 (35.3%)	
Type B	2 (11.8%)	4 (23.5%)	
Type C	0 (0.0%)	1 (5.9%)	
Type D	3 (17.6%)	0 (0.0%)	

No group difference in patellofemoral osteoarthritis or trochleadysplasia

Results

WOMAC

WOMAC score	Wave	Kahuna	p-Wert
Overall			
Baseline	60.7 ± 18.8	60.8 ± 16.5	0.984
Follow-up	67.6 ± 26.0	83.5 ± 11.5	**0.031**
p-value (pre vs post)	p=0.321	**p<0.001**	
Pain			
Baseline	63.8 ± 19.4	61.2 ± 21.0	0.705
Follow-up	71.5 ± 24.9	86.8 ± 10.4	**0.029**
p-value (pre vs post)	p=0.252	**p<0.001**	
Stiffness			
Baseline	59.6 ± 24.8	64.0 ± 25.3	0.612
Follow-up	63.2 ± 30.1	80.9 ± 23.8	0.068
p-value (pre vs post)	p=0.678	**p=0.035**	
Function			
Baseline	59.9 ± 20.5	60.4 ± 16.5	0.946
Follow-up	67.0 ± 26.4	82.8 ± 12.2	**0.035**
p-value (pre vs post)	p=0.338	**p<0.001**	

Kahuna sig. Better WOMAC Overall Values

Kahuna sig. better WOMAC pain values

Kahuna sig. better WOMAC stiffness values

Kahuna sig. better WOMAC function values

Results

VAS pain

Wave: 5.4±2.3 ➔ 2.8±2.1 (p< 0.001)
Kahuna: 5.8±2.3 ➔ 2.4±1.7 (p< 0.001)

No difference between Wave and Kahuna

Tegner activity level

Wave: 2.7±1.9 ➔ 2.6±2.0 (p= 0.82)
Kahuna: 2.5±1.1 ➔ 2.5±1.1 (p = 0.92)

No difference between Wave and Kahuna

No tibiofemoral osteoarthritis progression or changes in patellar level.

Results

Re-operations (except TKA)

Wave: 18% (n=4; 3xArthrolysis, 1xSynovectomy)
Kahuna: 4.5% (n=1; Tibial Tuberosity Transfer)

Conversion to TKA

Wave: 9% (n=2/22)
Kahuna: 9% (n=2/22)

Clinical Failure (WOMAC < 43)

Wave: 29.4% (n=5/17)
Kahuna: 0% (n=0/17)

Total failure

Wave: 32% (n=7/22)
Kahuna: 9% (n=2/22)

p = 0.04

Wave sig. higher overall failure than Kahuna

Limitations

- Small patient cohort
- No clinical examination
- Short follow-up

Conclusion

Both inlay components

improve pain (VAS)

prevent osteoarthritis progression (cave: short-term FU)

allow for a moderate level of activity

Kahuna:

Better knee function (WOMAC)

Lower complication or reoperation rate

Reduced overall failure

An enlarged trochlear component design (kahuna) leads to better postoperartive results than the conventional design (wave).

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Thank you

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